

## Original Research Article

# Study of use of saphenoperitoneal shunts in intractable ascites

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## ABSTRACT

**Background:** Ascites is a common complication in patients with chronic liver disease. Ascites usually complicates chronic liver disease, and some patients with ascites are refractory to medical treatment. Recently, saphenoperitoneal shunt was described to treat this condition. This procedure avoids the insertion of a foreign expensive shunt into the circulation. Describe the experience with this procedure with some changes in the technique.

**Methods:** A prospective study was performed on 8 patients with intractable ascites admitted to the surgical ward of Maharani Laxmi Bai Medical College during the period from November 1999 to April 2001. Eight patients with chronic liver disease and diuretic-resistant ascites underwent this procedure. The patients were classified by severity of liver disease as estimated from serum bilirubin and albumin values. Observations were present in tables, number and percentage using Microsoft excel.

**Results:** Procedure performed in 8 patients and was successful 6 patients. Effective doses of diuretics required were decreased to one eighth of the preoperative dose over a median 3 months post-operative period. No patient with successful shunt needed postoperative paracentesis or re-hospitalization in a median follow-up of 8 month. No other complication was found except ascitic leakage.

**Conclusions:** All patients, who had a successful shunt had symptomatic relief from ascites. Therefore the saphenoperitoneal shunt potentially offers all the benefits of peritoneovenous shunting without the disadvantage of using prosthetic material.

**Keywords:** Ascites, Chronic liver disease, Saphenoperitoneal shunt

## INTRODUCTION

Ascites is a pathological accumulation of excess fluid in the peritoneal cavity. It is most frequently encountered in patients with cirrhosis and other forms of severe liver diseases, but a number of other disorders may lead to either transudative or exudative ascites. Most patients with ascites respond favorably when treated with appropriate diet, salt-restriction, and diuretics. Some however, require ever increasing doses of diuretics and eventually become totally unresponsive to medical management. They are prone to encephalopathy and

hepatorenal syndrome (HRS), and more than half die in the first ten months after becoming refractory to medical management.<sup>1</sup> Diuretic therapy and salt restriction is not only unphysiologic, it makes health an unattainable goal for cirrhotics with ascites. Obviously other methods of treatment are needed. Ascitic fluid infused back into the circulatory system causes diuresis and n at uresis.<sup>2</sup> restores patients vigor and is generally favorable to renal function.<sup>3,4</sup> Early attempts at re-infusion of ascitic fluid into the systemic circulation using Holter Valve shunts were unsuccessful.<sup>5,6</sup> In 1974, LeVeen et al described a shunt with a pressure sensitive one way valve that returned ascitic fluid into inferior vena cava.<sup>7</sup> Initial

reports were enthusiastic. Wapnick et al, for example, found that survival was longer in patients receiving Le Vein shunts than in randomized controls treated medically.<sup>8</sup> Later reports, however, have cited a high incidence of shunt failure, sepsis disseminated intravascular coagulation, variceal bleeding and failure of correct HRS.<sup>9,10</sup> And a considerably mortality shortly after shunt placement.<sup>11</sup> Saphenoperitoneal shunting is another type of peritoneo venous shunting. First saphenoperitoneal shunt was reported by Pang et al from Singapore in 1992.<sup>12</sup> They used a Tenekhoff catheter to connect the peritoneum in the midline with the long saphenous vein. Salvage of a blocked LeVein shunt by rerouting into saphenous vein has also been described.<sup>13</sup> All of these previous techniques used prosthetic material. Most of the complications of peritoneovenous shunting is related to the prosthesis. Vadeyar et al modified shapheno-peritoneal shunting by using long saphenous vein, an endogenous material and are free from many complications of peritoneovenous shunting by metallic valve.<sup>14</sup>

We present our experience with this procedure with some changes in the technique.

## METHODS

A prospective study was performed on 8 patients with intractable ascites admitted to the surgical ward of Maharani Laxmi Bai Medical College during the period from November 1999 to April 2001. The study was approved by the Research Ethical Committee and informed consent was obtained in each case.

### Selection of cases

All patients referred to outpatient surgery department for an intractable ascites were selected for the study included in whom control ascites by medical means, including at least bed rest, suppression of alcoholic intake, salt restricted diet (<20 mmol/d), water restriction (<1 L/day), spironolactone (at least 400 mg/d) and or furosemide (at least 40 mg/d), failed. The patients requiring frequent paracentesis. The medical management had been pursued 1-4 months before referral. Patient with malignant ascites and chylous ascites were not selected for the study. Childs classification was not used since all patients have been included in group B and C because of ascites.

The patients were classified by severity of liver disease as estimated from serum bilirubin and albumin values.<sup>15</sup>

**Table 1: Distribution of groups with S. biirubin/S. albumin.**

Groups	S. biirubin/S. albumin
Group 1	<2 mg/dl/>3.5 mg/dl
Group 2	2-3 mg/dl/3-3.5 mg/dl
Group 3	>3 mg/dl/<3 mg/dl

### Pre-operative preparation

Routine pre-operative investigations Hb %, TLC, DLC, blood sugar, blood urea, S. creatinine and urine routine and microscopic examination were done. Liver function test was carried out in each patient i.e. S. bilirubin, SGOT, SGPT, alkaline phosphatase, s. albumin, s. globulin and prothombine time. Ascitic fluid examination for malignant cells were done. Doppler ultrasonography to confirm patency of long saphenous vein and competence of the saphenophemoral junction to allow flow from the superficial to deep system.<sup>22-24</sup> Ascites to be partially drained on the day before operation so that abdomen becomes lax. Pre-operative antibiotics were given to all the cases.

- Local anaesthesia: 0.5% lignocaine administered by local layer infiltration.
- Spinal anaesthesia: Sensoricaine 5% used in spinal block.

### Procedure

An inverted L-shaped incision was given with the horizontal limb extending along inguinal canal and vertical limb along the medial aspect of thigh. Inguinal canal was exposed and the bulging peritoneum at the internal ring is carefully isolated. A cut is made in the muscle fibres lateral to internal inguinal ring to facilitate this step. The long saphenous vein is exposed through the vertical part of this incision down to mid thigh level where it is divided. All the tributaries of the long saphenous vein draining at saphenofemoral junction are divided. The vein is observed to confirm that there is no back flow from the femoral vein and heparinised saline solution is instilled. The proximal cut end of the long saphenous vein is anastomosed to the cut edge of the incision in bulging peritoneum with continuous sutures using 4-0 poly propylene. Hemostasis was achieved and inguinal canal is reconstructed by closing the external oblique aponeurosis as in hernia repair. The wound is then closed.

### Postoperative management

Ofloxacin was given systematically for first 4 postoperative days then orally (200 mg/d for 3 days). Antacids was also given. On second post-operative day chest physiotherapy was started. On second post-operative day onwards tight abdominal binder was applied. Diuretics in form of spironolactone (400 mg/d) was started from postoperative day- 2 onwards. Persistent control of ascites was considered to reflect a patent shunt. Abdominal girth was measured daily to all cases.

### Discharge and follow up of patients

Patients were discharged on day 10 with confirmation of no complications, controlled ascites as confirmed by abdominal girth and reduction in requirement of dose of

diuretic. Patients were followed up for a period of one year of study and those who turned up were observed for recurrence of ascites.

## RESULTS

In present study total of 8 patients underwent saphenoperitoneal shunt. There were 5 males and 3 female subjects; average age was 33.2 years with age ranging from 24 to 54 years (Table 2).

**Table 2: Age wise distribution of cases.**

Age (in years)	No. of cases	Percentage (%)
<9	0	0.0
10-19	0	0.0
20-29	4	50.0
30-39	3	37.5
40-49	0	0.0
50-59	1	12.5
>60	0	0.0

**Table 3: Distribution of cases with respect to severity of liver damage.**

Group	No. of cases	Percentage (%)
1	8	100.0
2	0	0.0
3	0	0.0

**Table 5: Postoperative doses of diuretics.**

Postoperative period	Doses of diuretic req. in no. of patients				
	400 mg/day	200 mg/day	100 mg/day	50 mg/day	Nil
0-15 days	8				-
15-30 days		8	-	-	-
1-3 months	2		6		-
3-6 months			-	4	
6-12 months		-		4	-
>12 months					-

**Table 6: Distribution of cases with respect to complications.**

Complications	No. of cases
Wound	
Ascitic leak	4
Infection	-
Shunt occlusion	2
Coagulation disturbance	-
Edema of leg	-
Systemic sepsis	-
Spontaneous bacterial peritonitis	-
Inguinal hernia	-

Table 3 shows that the distribution of cases with respect to severity of liver damage, in which patients were classified into group 1, 2 and 3 on the basis of S. albumin and S. bilirubin. Found that all patients were included in group 1.

**Table 4: Type of anaesthesia administered.**

Types	No. of cases	Percentage (%)
Local anaesthesia	1	12.5
Spinal anaesthesia	7	87.5

Above Table 4 depicts that the saphenoperitoneal shunt was made under spinal anaesthesia in 7 patients, 1 shunt was made under local anaesthesia.

Table 5 describes the post-operative doses of diuretics in patients, 6 patients with successful shunt formation, median dose of diuretic reduced from 400 mg spirono lactone/day to 50mg/day, 3 months after operation. 4 patients were followed up to one year with diuretic requirement of 50mg/day. No patient required paracentesis in a median follow up of 8 months.

Above Table 6 illustrates the cases with complications, in which 2 patients had shunt failure due to occlusion. Four patients had ascitic leakage up to 3-4 days from operation which stopped spontaneously. No patient had wound infection or any other complication.

## DISCUSSION

Various methods of peritoneovenous shunting include LeVeen shunt, Denver shunt & saphenoperitoneal shunts. In the study of Bernhoft et al with LeVeen shunt and Denver shunt, 35 patients underwent 51 shunts of which 50 were LeVeen shunts and one was a Denver shunt.<sup>15</sup> There were 24 male and 11 female subjects; the mean age was 50.1 years with age ranging from 10 months to 67 years. In our study total of 8 patients underwent saphenoperitoneal shunt. There were 5 males and 3 female subjects; average age was 33.2 years with age ranging from 24 to 54 years. It is inappropriate to draw any conclusion about the age and sex distribution except

that there were more male patients. In our study of 8 patients all were classified as group C liver disease because of uncontrolled ascites. These patients were further classified into on the basis of S. albumin & S. bilirubin. There was no postoperative death which is comparable to the previous study of Bernhoft et al.<sup>15</sup> In our study most of cases were operated under spinal, though it may be performed under local anaesthesia. Whereas, shunt was performed in all the 35 patients under local anaesthesia.<sup>15</sup> Smajda and Franco, 1985 in his study of 140 patients with LeVeen shunt, doses of diuretics required were furosemide 80 mg/d for 2-6 months.<sup>19</sup> Furthermore, in the study of Vadeyar et al with saphenoperitoneal shunt 7 patients who had successful surgery, median dose of diuretic was reduced from a median dose of 300 mg/day to 50mg/day in the 3 months after operation.<sup>14</sup> In our study, 6 patients with successful shunt formation, median dose of diuretic reduced from 400mg spirono lactone/day to 50mg/day 3 months after operation. Our results are similar to that of previous study of Vadeyar et al and better to Samadja et al with LeVeen shunt.<sup>14,19</sup> Although peritoneovenous shunt (LeVeen shunt) is effective, it is associated with a high rate of complications which has effectively restricted its use. High rate of complications (57% operative, 34% late) was largely due to technical failures (shunt malfunction 26%, shunt infection and ascitic leakage 8%). Failures were mostly due to faulty insertion technique. Markey et al, reported that in patients with history of variceal bleeding, insertion of a LeVeen shunt would precipitate further bleeding.<sup>10</sup> Variceal bleeding was managed by nonsurgical means, endoscopic sclerotherapy.<sup>19</sup> Obstruction of the shunt was the most common complication and occurred in more than the one third of patients. About 10% of shunts become infected necessitating their removal. The intraperitoneal injection of radioisotopes has been advised as a method to diagnose the non-functional shunt. The technetium labelled albumin micro-spheres are injected into the peritoneal cavity and followed to see if they enter the blood stream and embolise to the lungs. If the valve system is occluded, the isotope will remain in the abdomen.<sup>7</sup> In the similar study with saphenoperitoneal shunt by Vadeyar et al.<sup>14</sup> In our study, 2 patients had shunt failure due to occlusion. Four patients had ascitic leakage up to 3-4 days from operation which stopped spontaneously. Postoperative complications were less except incidence of shunt occlusion which was higher than other studies 2 shunt failures as compared to one shunt failure in the previous study of Vadeyar et al.<sup>14</sup> In our study and even otherwise the causes of shunt failure may be due to short length of long saphenous vein is mobilized leading to tension on the anastomotic site. Kinking at the saphenofemoral junction as would occur if the length of the great saphenous vein is kept short and the anastomosis (saphenoperitoneal) is made with a straight mobilized great saphenous vein and this may cause irreversible shunt failure which could be overcome intraoperatively by looping the long saphenous vein at the saphenofemoral junction. The peritoneal opening must be

made by removal of a patch instead of making a slit which may easily close down and cause shunt failure. In our study with saphenoperitoneal shunt survival rate being 100% at 2 months and 6 months. No follow up available for one year or more. Ascites was controlled in patients with successful shunt effectively.

## CONCLUSION

All patients, who had a successful shunt had symptomatic relief from ascites. Therefore the saphenoperitoneal shunt potentially offers all the benefits of peritoneovenous shunting without the disadvantage of using prosthetic material. Both the time span of one year and number of patients under study, are inadequate to draw a definite conclusion about the long term affectivity of the shunt. Further studies with larger number of patients with longer follow-ups are necessary to substantiate this.

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